

THE EXPERIMENTAL COMPARISON
OF TWO METHODS OF TREATING AREAS
INFESTED BY THE BLACK HILLS BEETLE
(D. ponderosae)

Conducted on
East Fork of Black's Fork
Wasatch National Forest

December

1940

1. PURPOSE:

A. To compare the relative costs and effectiveness of treating areas of lodgepole pine infested by the Black Hills beetle (D. ponderosae), by two methods:

- i. Spotting ahead before treating.
- ii. No spotting ahead before treating.

2. METHOD:

A. Crews were selected so that each crew would have the same proportion of men who had had spotting experience.

B. The areas to be worked were contiguous. They were selected, on the basis of the preliminary survey, with the intention that there would be the same number of trees on each area, as nearly as possible.

C. The crew which was working on the spotted-ahead area had the services of a scout (not full time, but only the usual number of man-hours per crew). His time was charged against each tree treated on this area. The crew with no spotting had a working foreman, but no scout. They stripped the area in spotting formation, carrying their tools.

D. Both crews used the same method of tree-treatment, i.e. - decking and burning.

3. PERCENTAGE OF MISSES:

A. Spotting ahead before treating (58 spotted trees treated)

- i. Pickups by treating crew = 6 missed by spotters.
 $\frac{6}{64} = 9.4 \% \text{ missed spotters.}$
- ii. Pickups by clean-up crew (spotters) (missed by treating crew) -- 5
 $\frac{5}{69} = 7.2 \% \text{ missed by treaters and spotters.}$
- iii. Total misses by original spotters
 $\frac{6 + 5}{69} = 16\%$
- iiii. No spotted trees were missed by treaters.

B. No spotting ahead before treating--(30 trees treated)

- i. Pickups by cleanup crew (spotting)
(misses by treating crew) -- 5
Percentage of misses = $\frac{5}{35} = 14.3 \%$

4. COSTS:

A. Spotting ahead before treating:

- i. Acres -- 155 Cost per acre -- 51¢
Trees per acre .41
- ii. Trees treated -- $58 \div 6 = 64$ Cost per tree \$1.25
- iii. Cost calculation (variable costs only--
fixed costs being regarded as equal for
both methods)
- a. Spotting--40¢ per tree ($\frac{6 \text{ man days} \times \$4.00}{60 \text{ trees}}$)
58 spotted trees @ 40¢ per tree 23.20
- b. Treating
6 men 2 days @ \$4.00 48.00
- c. Scouting and checking decks
1.63 man days @ \$5.20 8.48
\$79.68
- d. Cost per tree
 $79.68 \div 64 \text{ equals}$ 1.25

B. No spotting-ahead before treating

- i. Acres -- 115 cost per acre -- 44¢
- ii. Trees treated -- 30 Cost per tree \$1.68
- iii. Cost calculation
- a. Treating
6 men 2 days @ \$4.00 per day 48.00
- b. Checking decks
1 man $\frac{1}{2}$ day @ \$5.20 per day 2.60
\$50.60
- c. Cost per tree
 $50.60 \div 30 \text{ equals}$ \$1.68

5. COMPLETENESS OF KILL ON TREATED TREES:

- A. All treated trees were decked and burned by both crews.
 - B. All decks and tops were checked by Camp Foreman.
- A 100% kill was obtained under both methods.

6. THE CLEAN UP

Both experimental areas were re-spotted by the spotting crew and afterwards treated. Five trees were found on each area and they were included in results under 3. The clean up cost \$24.00 on each area, or a total cost per tree of \$4.00.

7. SUMMARY AND CONCLUSIONS

A. Quality--The number of misses appears to be unduly high by both crews when compared to the 5.6% for the regular project where infested trees are more dense. It indicates that more misses may be expected on areas having fewer infested trees. Visibility conditions were bad on both areas due to the snow and the attacks were very blind. However, the spotting ahead method is clearly the best method to get the most bugs. The experiment indicated that more than half of the total missed by the spotters are picked up by the treaters. The spotting-treating crew missed 7.2% as compared to 14.3% missed by the crew treating without spotting.

B. Comparative Costs--While the cost-per-tree for the spotted-treated area was 43¢ less than for the non-spotted area, it is felt that this is partially accounted for by the character of the infestation. Although the areas were adjacent and, according to the survey, equally infested, the spotted area had .41 trees per acre compared with .26 on the non-spotted area (see map of areas). It is believed that the costs might have been about equal on the same areas with advantage going to the spotting-treating method on lightly infested areas. The cost per tree for effective labor on the Blacks Fork project as a whole, using the spotting-ahead method, was about \$1.10 for 2399 trees. This smaller cost is due to the greater trees per acre figure of 1.6.

C. Conclusions--All concerned with the experiment were agreed that there would probably be little difference in the cost on exactly the same areas.

Also, it was unanimously agreed that the spotting-ahead method assured fewer infested trees would be left on the area. This factor leads to the conclusion that it is the best method to follow under most circumstances. It also gives a better basis for planning, since it can be used to determine actual number of trees previous to treating, in some instances. This serves as the best guide to the number of men, and amount of money needed, and the location of camps.

It is thought that treating without spotting would work to advantage on areas of heavy infestation as compared with lightly infested areas.

It is believed that trees-per-acre should be given greater consideration when making estimates of treating costs on specific units.

An experiment over a larger area carried on for a longer period of time might yield more conclusive results, but it did not seem justified, considering the high cost of the clean up job, which is necessary as a check, and the disruption of regular work.

Respectfully submitted,

Bruce V. Groves

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Junior Forester

Approved 1/21/31
J. E. H.

F. S.

WLF
October 26, 1940.

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CONTROL - Wasatch
Insect

MEMORANDUM FOR FILES:

After examination of the Iron Mine project Messrs. Hester, Groves, Mathews and I made a trip to the East Fork of Blacks Fork and examined the control work done there last season.

The data concerning this infestation are as follows:

New attacks 1939	-	11,000 trees
Treated 1940	-	5,571 "
New attacks 1940	-	7,442 "

Of the total 7,442 estimated new attacks for 1940, 6,200 are new attacks on areas treated in 1939. The balance, 1,242, are new attacks on untreated areas of endemic proportions in 1939 but now epidemic.

Data are not available here but the Wasatch records indicate that very few trees spotted were left untreated. It was expected that there would be a few misses by the spotters and a few by the treaters.

The 1940 survey indicates a heavy reinfestation of the treated area. Mr. Furniss' and Mr. Hester's examination confirm this general finding. Examination indicates that the reinfestation is due generally to:

- a. Ineffectiveness of the standing-burning method of control.
- b. Ineffective work.

Specifically as regards (a) it was found that in the majority of the cases the guess as to height of infestation was low. This resulted in untreated tops. As regards (b) it was found that:

1. Too many trees were missed by spotters. Due to the difficulty of spotting blind attacks many singles were missed, some of

which were unavoidable. As pointed out by Mr. Hester, however, the missing of trees in a group is careless work.

2. Application of too little heat.

- a. In tops.
- b. On stumps.
- c. On portions of the bole.

The above was true as regards standing or felled trees.

The reinfestation, therefore, in such heavy numbers it is felt is due to the above ineffectiveness of the job and also to the nature of the epidemic which is apparently in the "build-up" stage.

There are, of course, reasons for the ineffective work which are stated here not as alibis but to list the causes for failure with specific remedies for their correction.

Objectives and standards are too low for effective work. Nothing less than 100 percent kill on treated trees should be acceptable. All infested trees that it is humanly possible to find should be treated and treated 100 percent.

All phases of the work have been conducted to too low a standard. This applies to everything from the survey to and including the control. To be specific:

a. Survey.

- 1. No control is run.
- 2. Starting points are poorly described.
- 3. No ties are mentioned.
- 4. Random traverse is employed in lieu of gridironing.

All the above are violations of principles employed in the conduct of timber surveys, some are violations of handbook instructions and some are simply poor work.

To bring the above to acceptable standards it is recommended:

- 1. In surveyed or unsurveyed territory control be run and stations which will survive two to five seasons set at ~~ten~~-chain (latitude or departure) intervals. The methods employed in timber survey work should be employed. The traverse should be adjusted to fit the layout. For more detailed instructions consult the handbook.

2. Use the control.
3. Give starting point accurately and ties to closing points.
4. Gridiron - not random traverse.

b. Spotting.

Too much stress was given to speed. Thoroughness should be the goal. I observed that with respect to Carlson's crew that with Carlson acting as compassman-chief, his big effort was devoted to keeping up with his crew. Little attention was given to examining doubtful trees or observing the actions or coverage being effected by the spotters. Ketchie was slower but perhaps no more thorough and at the time of my last visit he had been divorced from the compass work and was acting solely as chief of party.

These crews should consist of active, conscientious bug men. They should not be required to cover so much ground that by the middle of the week they are exhausted nor should a man finding a lot of infested trees be constantly under pressure to "hurry up and get going".

Use the spotting method suggested by Mr. Hester. Start from the control point. Compassman runs line from this point - spotters to the right. Set stations at regular prescribed intervals. At the end of the strip pivot on the compassman who back tracks using the stations to correct for distance.

Examine every tree.

Examine groups carefully and get all infested trees.

Be accurate. Careful work has priority over speed.

c. Control.

Standing-burning is out except for trees where the upper limit of infestation can be reached with an axe.

Deck and burn or burn singly. There must be no live insects, larvae or pupae left in stumps or trees.

Initial the stump so responsibility can be fixed.

Check, check, check the work.

d. General.

The effects of faulty organization were, it is believed, to blame for many of our troubles. Fighting an insect epidemic is comparable in many ways to fighting fire and poor organization is just as disastrous. We still have cases of inexperienced fire bosses trying to be fire boss, sector boss, timekeeper and camp boss. Invariably they fail at all.

The man in charge, project managers and crew foremen should be in the woods. They should be provided with timekeeper-clerks to take care of paper work and supply. It is realized that it is extremely difficult to obtain experienced personnel as regards control work. However, it should not be too difficult to obtain men of the clerk type to take over paper work and supply.

The above points have all been discussed fully by Messrs. Miles, Robb, Hester, Groves, and Mathews and agreement reached.

The following details were also agreed upon and should be followed unless permission is given for change.

1. Iron Mine Project.

Trees now cut to be carefully treated. No additional trees to be cut nor additional treatment given trees already partially treated. Any balance in funds to be used to finance additional overhead, material, horse hire, etc., for CCC work.

2. Provo River (Broadhead-Haystack Units).

To be covered by CCC crews from a side camp at Kamas.

Some experimenting to be done testing costs of burning in decks vs. burning singly or not decked. One hundred percent kill the objective in either case.

3. East Fork of Blacks Fork.

- a. To be covered by P&M labor exclusively.
- b. Complete coverage of this unit to be the goal.
- c. Spotting and control to commence at once.

d. Experiment on similar and average areas on identical dates. One area to be treated by the control crew without spotting done by a crew in advance of treatment. The second area to be spotted and then treated by a control crew.

Detailed costs should be kept and all items accurately arrived at.

A very thorough check of the work will be made by the project manager. He will check and report upon:

1. Completeness of the kill on treated trees for each crew.
2. Percentage of misses for:
 - a. Crew with no spotting.
 - b. Crew with spotting.
 1. Misses by spotters.
 2. Misses of spotted trees by treaters.
 3. Pick-ups by treaters of misses by spotters.
 4. Net score.
3. Costs for each crew in detail to this point.

4. Upon completion of this phase of the work both treating crews will be sent back to their respective areas to pick up the missed trees and to put their areas in satisfactory shape. These elements of cost for clean-up will be reported as "clean-up" work.

The report then will enable conclusions to be drawn as to:

1. Whether or not satisfactory work can be done without spotting.
2. Comparative costs.

The experiment is to compare spotting vs. no spotting and the burning in decks vs. burning singly argument should not be introduced to cloud the issue. The choice as to this should be made by the project manager and both crews use the same methods. Both crews may burn standing only the trees not infested higher than man plus axe handle. It is believed advisable that all crews be informed as to the nature of the experiment. They then will realize that careful work will have to be done the first time over as clean-up work will add to their costs and may result in absolute rejection of their method of treatment. It also will serve as a standard for future work.

In conclusion it may be stated that for a number of reasons our 1939-40 control work has not been as successful as we would wish. The standing-burning method proved ineffective considering the 100 percent standards we now feel we must have to attain success -

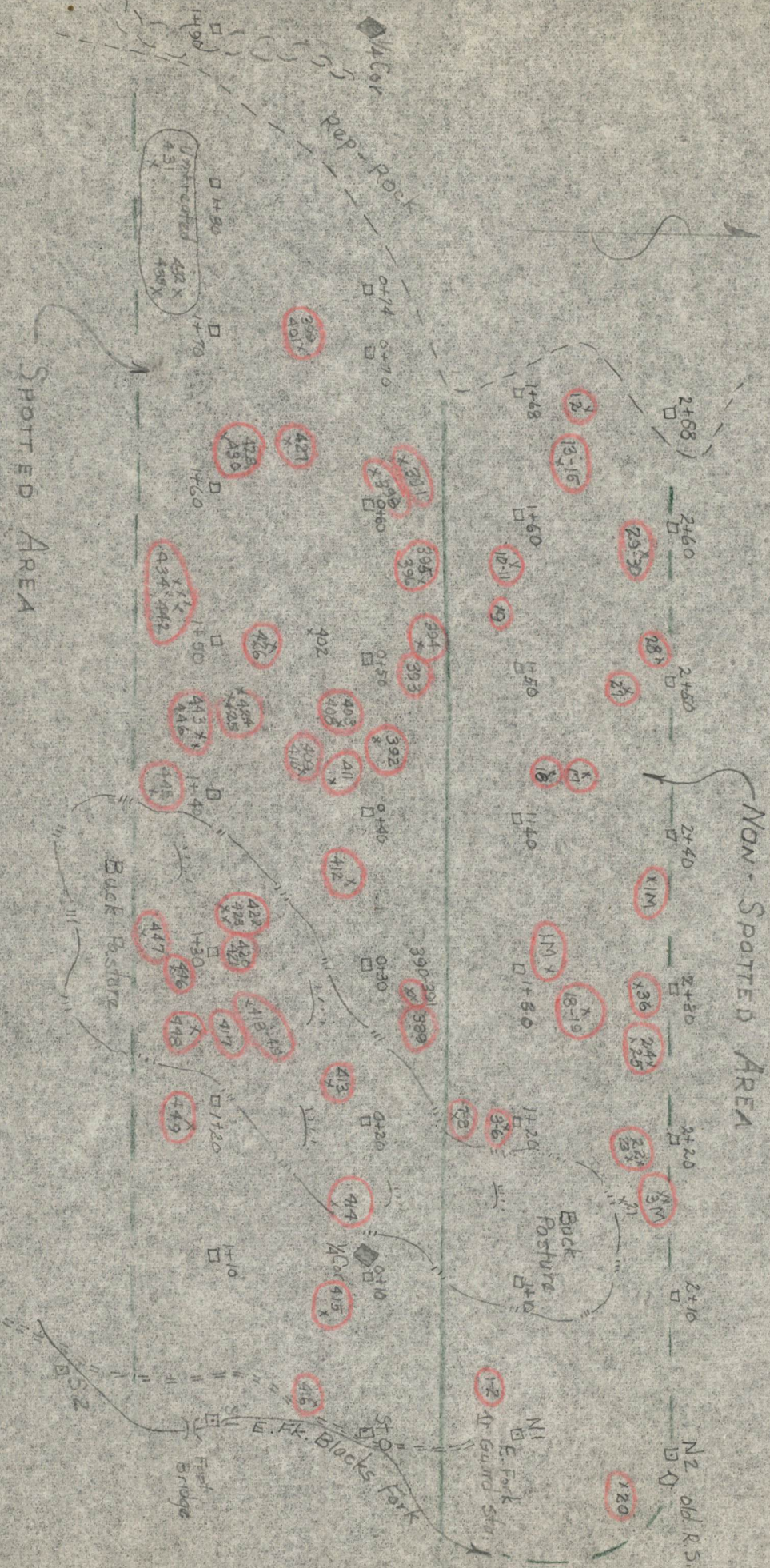
experienced "bug men" are few - fire hazards were great. We know now, however, what our problems are and have had our weaknesses pointed out. It is hoped that the above frank statements of plain facts as I see them will be accepted as an attempt at constructive criticism and the attempt made by all of us to get together, tighten up and make this season's work a success.

Charles W. Miles

Associate Forester.

Sec. Cor.

Sec. Cor.



EXPERIMENTAL AREA MAP
SPOTTING VS. NON SPOTTING
Scale 8" = 1 Mile

LEGEND
① = Trace Not Treated
1+30 = 30 MINS FROM
STATION #1
1-18-91
RUG